AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 27 (previously presented): A surface acoustic wave filter comprising:

a piezoelectric substrate; and

a longitudinally-coupled-resonator surface acoustic wave filter portion provided on the piezoelectric substrate; wherein

the longitudinally-coupled-resonator surface acoustic wave filter portion includes an odd number of at least three interdigital transducers arranged such that a plurality of comb electrodes having a plurality of electrode fingers are interdigitated, the interdigital transducers being disposed along a surface-acoustic-wave propagation direction, and first and second reflectors disposed along the surface-acoustic-wave propagation direction so that the at least three interdigital transducers are located between the first and second reflectors;

the odd number of at least three interdigital transducers include a central interdigital transducer arranged in the approximate center, and first and second interdigital transducers disposed at two sides of the central interdigital transducer, an electrode finger of the first interdigital transducer which is adjacent to the central interdigital transducer is a ground electrode, and an electrode finger of the second interdigital transducer which is adjacent to the central interdigital transducer is a signal electrode;

the comb electrodes disposed on one side of the central interdigital transducer include first and second bisected comb electrodes obtained by bisecting the one of the opposing comb electrodes along the surface-acoustic-wave propagation direction;

the first and second bisected comb electrodes are respectively displaced toward the first and second interdigital transducers and are respectively connected to first and second balanced signal terminals;

the first and second interdigital transducers which are adjacent to the central interdigital transducer are connected to an unbalanced signal terminal; and

when, in the central interdigital transducer, an imaginary central axis that is substantially perpendicular to the surface-acoustic-wave propagation direction is assumed, design parameters of at least one of the interdigital transducers and the reflectors, which are disposed on opposite sides of the imaginary central axis in the central interdigital transducer that is substantially perpendicular to the surface-acoustic-wave propagation direction, are set to be different from one another at the sides of the imaginary central axis.

Claim 28 (previously presented): The surface acoustic wave filter according to Claim 27, wherein the at least one of the interdigital transducers and the first and second reflectors, which are disposed on opposite sides of the imaginary central axis, are asymmetrically arranged at the sides of the imaginary central axis.

Claim 29 (previously presented): The surface acoustic wave filter according to Claim 27, wherein:

the polarities of two outermost electrode fingers of the central interdigital transducer are substantially identical to that of one of the ground electrode and a float electrode; and

the electrode finger pitch of at least a portion of the first interdigital transducer is greater than the electrode finger pitch of the second interdigital transducer.

Claim 30 (previously presented): The surface acoustic wave filter according to Claim 27, wherein the polarities of two outermost electrode fingers of the central interdigital transducer are substantially identical to that of the signal electrode, and the electrode finger pitch of at least a portion of the second interdigital transducer is greater than the electrode finger pitch of the first interdigital transducer.

Claim 31 (previously presented): The surface acoustic wave filter according to Claim 27, wherein the electrode finger pitch of at least a portion of the first bisected comb electrode, which is closer to the first interdigital transducer, is greater than the electrode finger pitch of the second bisected comb electrode.

Claim 32 (previously presented): The surface acoustic wave filter according to Claim 27, wherein an adjacent-electrode-finger center-to-center distance between the first interdigital transducer and the central interdigital transducer is greater than an adjacent-electrode-finger center-to-center distance between the second interdigital transducer and the central interdigital transducer.

Claim 33 (previously presented): The surface acoustic wave filter according to Claim 27, wherein the polarities of two outermost electrode fingers of the central interdigital transducer are substantially identical to that of a ground electrode or a float electrode, and an electrode-finger center-to-center distance between the first interdigital transducer and the first reflector adjacent to the first interdigital transducer is greater than an electrode-finger center-to-center distance between the second interdigital transducer and the second reflector adjacent to the second interdigital transducer.

Claim 34 (previously presented): The surface acoustic wave filter according to Claim 27, wherein the polarities of two outermost electrode fingers of the central interdigital transducer are substantially identical to that of a signal electrode, and an electrode-finger center-to-center distance between the second interdigital transducer and the second reflector adjacent to the second interdigital transducer is greater than an electrode-finger center-to-center distance between the first interdigital transducer and the first reflector adjacent to the first interdigital transducer.

Claim 35 (previously presented): The surface acoustic wave filter according to Claim 27, wherein the duty of electrode fingers in at least a portion of the first interdigital transducer is greater than the duty of electrode fingers of the second interdigital transducer.

Claim 36 (previously presented): The surface acoustic wave filter according to Claim 27, wherein the polarities of two outermost electrode fingers of the central interdigital transducer are substantially identical to that of a ground electrode or a float electrode, and the duty of electrode fingers of the first bisected comb electrode is greater than the duty of electrode fingers of the second bisected comb electrode.

Claim 37 (previously presented): The surface acoustic wave filter according to Claim 27, wherein two outermost electrode fingers of the central interdigital transducer are signal electrodes, and the duty of electrode fingers of the second bisected comb electrode is greater than the duty of electrode fingers of the first bisected comb electrode.

Claim 38 (previously presented): The surface acoustic wave filter according to Claim 27, wherein:

the odd number of at least three interdigital transducers has, in areas in which two interdigital transducers are adjacent to each other, narrow pitch electrode finger portions having smaller electrode finger pitches than with surrounding electrode finger portions; and

the electrode finger pitch of one narrow pitch electrode finger portion in an area in which the first interdigital transducer and the first bisected comb electrode are adjacent to each other is greater than the electrode finger pitch of one narrow pitch electrode finger portion in an area in which the second interdigital transducer and the second bisected comb electrode are adjacent to each other.

Claim 39 (previously presented): A surface acoustic wave filter comprising:

a piezoelectric substrate; and

a longitudinally-coupled-resonator surface acoustic wave filter portion disposed on the piezoelectric substrate; wherein

the longitudinally-coupled-resonator surface acoustic wave filter portion includes an odd number of at least three interdigital transducers arranged such that a plurality of comb electrodes having a plurality of electrode fingers are interdigitated, the interdigital transducers being disposed along a surface-acoustic-wave propagation direction, and first and second reflectors disposed along the surface-acoustic-wave propagation direction such that the at least three interdigital transducers are located between both reflectors;

the odd number of at least three interdigital transducers includes a central interdigital transducer arranged in the approximate center, and first and second interdigital transducers disposed at two sides of the central interdigital transducer, an electrode finger of the first interdigital transducer which is adjacent to the central interdigital transducer is a ground electrode, and an electrode finger of the second interdigital transducer which is adjacent to the central interdigital transducer is a signal electrode;

the comb electrodes disposed on one side of the central interdigital transducer include first and second bisected comb electrodes obtained by bisecting the one of the opposing comb electrodes along the surface-acoustic-wave propagation direction;

the first and second bisected comb electrodes are respectively displaced toward the first and second interdigital transducers and are respectively connected to first and second balanced signal terminals;

the first and second interdigital transducers which are adjacent to the central interdigital transducer are connected to an unbalanced signal terminal;

the surface acoustic wave filter further includes first and second surface acoustic wave resonators respectively connected between the first interdigital transducer and the unbalanced signal terminal and between the second interdigital transducer and the unbalanced signal terminal;

each of the first and second surface acoustic wave resonators includes an interdigital transducer and reflectors disposed at two sides of the interdigital transducer in the surface-acoustic-wave propagation direction; and

design parameters of the first and second surface acoustic wave resonators are different from one another.

Claim 40 (previously presented): The surface acoustic wave filter according to Claim 39, wherein the electrode finger pitch of at least a portion of the first surface acoustic wave resonator is greater than the electrode finger pitch of the second surface acoustic wave resonator.

Claim 41 (previously presented): The surface acoustic wave filter according to Claim 39, wherein a ratio between the electrode finger pitch of the interdigital transducer of the first surface acoustic wave resonator and the electrode finger pitch of one reflector of the first surface acoustic wave resonator is greater than a ratio between the electrode finger pitches of the interdigital transducer and one reflector in the second surface acoustic wave resonator.

Claim 42 (previously presented): The surface acoustic wave filter according to Claim 39, wherein an electrode-finger center-to-center distance between the interdigital transducer and one reflector in the first surface acoustic wave resonator is greater than an electrode-finger center-to-center distance between the interdigital transducer and one reflector in the second surface acoustic wave resonator.

Claim 43 (previously presented): The surface acoustic wave filter according to Claim 39, wherein the duty of electrode fingers of the second surface acoustic wave resonator is greater than the duty of electrode fingers of the first surface acoustic wave resonator.

Claim 44 (currently amended): A surface acoustic wave filter comprising:

a piezoelectric substrate; and

a longitudinally-coupled-resonator surface acoustic wave filter portion disposed on the piezoelectric substrate; wherein

the longitudinally-coupled-resonator surface acoustic wave filter portion includes an odd number of at least three interdigital transducers arranged such that a plurality of comb electrodes having a plurality of electrode fingers are interdigitated, the interdigital transducers being disposed along a surface-acoustic-wave propagation direction, and first and second reflectors disposed along the surface-acoustic-wave propagation direction such that the at least three interdigital transducers are located between the first and second reflectors;

the odd number of at least three interdigital transducers includes a central interdigital transducer located in the approximate center, and first and second interdigital transducers disposed at two sides of the central interdigital transducer, an electrode finger of the first interdigital transducer which is adjacent to the central interdigital transducer is a ground electrode, and an electrode finger of the second interdigital transducer which is adjacent to the central interdigital transducer is a signal electrode;

the comb electrodes disposed on one side of the central interdigital transducer include first and second bisected comb electrodes obtained by bisecting the comb electrodes along the surface-acoustic-wave propagation direction;

the first and second bisected comb electrodes are respectively displaced toward the first and second interdigital transducers and are respectively connected to first and second balanced signal terminals;

the first and second interdigital transducers which are adjacent to the central interdigital transducer are connected to an unbalanced signal terminal;

the surface acoustic wave filter further includes first and second surface acoustic wave resonators respectively connected between the first interdigital transducer and the ~~unbalanced~~ first balanced signal terminal and between the second interdigital transducer and the ~~unbalanced~~ second balanced signal terminal;

each of the first and second surface acoustic wave resonators include an interdigital transducer and reflectors disposed at two sides of the interdigital transducer in the surface-acoustic-wave propagation direction; and

design parameters of the first and second surface acoustic wave resonators are different from one another.

Claim 45 (previously presented): The surface acoustic wave filter according to Claim 44, wherein the electrode finger pitch of at least a portion of the first surface acoustic wave resonator is greater than the electrode finger pitch of the second surface acoustic wave resonator.

Claim 46 (previously presented): The surface acoustic wave filter according to Claim 44, wherein a ratio between the electrode finger pitches of the interdigital transducer and one reflector in the first surface acoustic wave resonator is greater than a ratio between the electrode finger pitches of the interdigital transducer and one reflector in the second surface acoustic wave resonator.

Claim 47 (previously presented): The surface acoustic wave filter according to Claim 44, wherein an electrode-finger center-to-center distance between the interdigital transducer and one reflector in the first surface acoustic wave resonator is greater than

an electrode-finger center-to-center distance between the interdigital transducer and one reflector in the second surface acoustic wave resonator.

Claim 48 (previously presented): The surface acoustic wave filter according to Claim 44, wherein the duty of electrode fingers of the second surface acoustic wave resonator is greater than the duty of electrode fingers of the first surface acoustic wave resonator.

Claim 49 (previously presented): The surface acoustic wave filter according to Claim 27, further comprising a second longitudinally-coupled-resonator surface acoustic wave filter portion cascade-connected to said longitudinally-coupled-resonator surface acoustic wave filter portion.

Claim 50 (previously presented): The surface acoustic wave filter according to Claim 39, further comprising a second longitudinally-coupled-resonator surface acoustic wave filter portion cascade-connected to said longitudinally-coupled-resonator surface acoustic wave filter portion.

Claim 51 (previously presented): The surface acoustic wave filter according to Claim 44, further comprising a second longitudinally-coupled-resonator surface acoustic wave filter portion cascade-connected to said longitudinally-coupled-resonator surface acoustic wave filter portion.

Claim 52 (previously presented): The surface acoustic wave filter according to Claim 49, wherein the second longitudinally-coupled-resonator surface acoustic wave

filter portion includes a central interdigital transducer and first and second interdigital transducers disposed at two sides of the central interdigital transducer, and the number of electrode fingers of the central interdigital transducer is even.

Claim 53 (previously presented): The surface acoustic wave filter according to Claim 50, wherein the second longitudinally-coupled-resonator surface acoustic wave filter portion includes a central interdigital transducer and first and second interdigital transducers disposed at two sides of the central interdigital transducer, and the number of electrode fingers of the central interdigital transducer is even.

Claim 54 (previously presented): The surface acoustic wave filter according to Claim 51, wherein the second longitudinally-coupled-resonator surface acoustic wave filter portion includes a central interdigital transducer and first and second interdigital transducers disposed at two sides of the central interdigital transducer, and the number of electrode fingers of the central interdigital transducer is even.

Claim 55 (previously presented): The surface acoustic wave filter according to Claim 49, further comprising:

a first signal line for electrically connecting the first interdigital transducer of the second longitudinally-coupled-resonator surface acoustic wave filter portion and the first or second interdigital transducer of said longitudinally-coupled-resonator surface acoustic wave filter portion; and

a second signal line for electrically connecting the second interdigital transducer of the second longitudinally-coupled-resonator surface acoustic wave filter portion and the second or first interdigital transducer of said longitudinally-coupled-resonator

surface acoustic wave filter portion; wherein the phases of signals transmitted through the first and second signal lines have a difference of approximately 180 degrees.

Claim 56 (previously presented): The surface acoustic wave filter according to Claim 50, further comprising:

a first signal line for electrically connecting the first interdigital transducer of the second longitudinally-coupled-resonator surface acoustic wave filter portion and the first or second interdigital transducer of said longitudinally-coupled-resonator surface acoustic wave filter portion; and

a second signal line for electrically connecting the second interdigital transducer of the second longitudinally-coupled-resonator surface acoustic wave filter portion and the second or first interdigital transducer of said longitudinally-coupled-resonator surface acoustic wave filter portion; wherein the phases of signals transmitted through the first and second signal lines have a difference of approximately 180 degrees.

Claim 57 (previously presented): The surface acoustic wave filter according to Claim 51, further comprising:

a first signal line for electrically connecting the first interdigital transducer of the second longitudinally-coupled-resonator surface acoustic wave filter portion and the first or second interdigital transducer of said longitudinally-coupled-resonator surface acoustic wave filter portion; and

a second signal line for electrically connecting the second interdigital transducer of the second longitudinally-coupled-resonator surface acoustic wave filter portion and the second or first interdigital transducer of said longitudinally-coupled-resonator

surface acoustic wave filter portion; wherein the phases of signals transmitted through the first and second signal lines have a difference of approximately 180 degrees.

Claim 58 (previously presented): A communication apparatus including the surface acoustic wave filter as defined in Claim 27.

Claim 59 (previously presented): A communication apparatus including the surface acoustic wave filter as defined in Claim 39.

Claim 60 (previously presented): A communication apparatus including the surface acoustic wave filter as defined in Claim 44.